What is the correct value for Np for determining TxSNDR of test transmitter during calibration of the Interference Tolerance Test. Addresses D1.3 comments 200,446,552 and 557.

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Introduction

- The interference tolerance is intended to test receivers with a worst case input signal.
- The following description uses the specifics of the 200GBASE-KR test but the principles apply equally to CR, C2C and C2M although the test systems differ somewhat.
- The test is described in 178.9.3.3 and uses the test system shown in figure 93C-2 with the exception that TP0a is replaced by TP0v and TP5a is replaced by TP5v.
- The description that follows is somewhat simplified for clarity.

Calibration of the Interference tolerance Test.

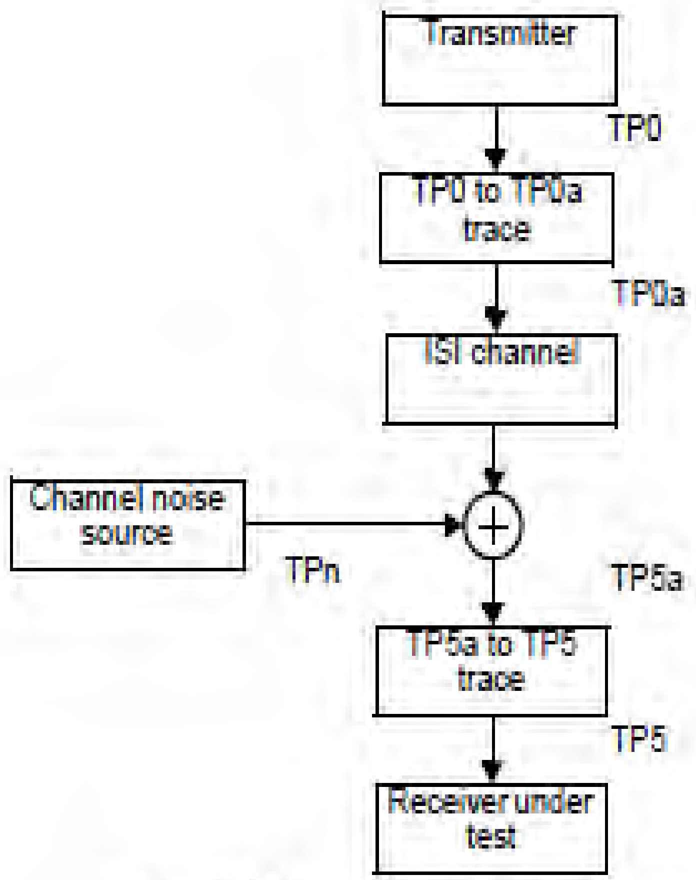

Figure 93C–2—Interference tolerance test setup

- The TP0 to TP0a trace is omitted if an instrument grade Transmitter is used.
- The Transmitter is measured at TP0a for jitter and TxSNDR and risetime
- The S parameters of the test channel (from TP0 to TP5 are measured.
- COM is calculated using the Measured Transmitter characteristics for jitter and risetime and replacing TxSNR with the measured value of TxSNDR.
- The Channel noise source amplitude is adjusted to achieve the target value of COM (3dB)

Effect of Np on SNDR and hence added noise in the interference tolerance test.

- Np is the length of the fitting function used to determine what the “wanted signal” looks like (the linear Fit). Deviations from this are RSS added to form Sigma e which is RSS added to the measured noise to determine the total signal and distortion and the ratio of this to the wanted signal amplitude is the SNDR
- If there is ISI (e.g. caused by reflections) outside the length of Np it will increase Sigma e and hence degrade TxSNDR which will in turn result in less Channel noise being added.
- If there is ISI inside the length of Np the Sigma e will not be changed and the channel noise will not be affected.

What should the value of Np be?

- Considering the situation with an ISI channel without significant reflections. ISI in the test transmitter will be equalized by the DUT's receiver up to the length of that receiver's floating taps.
- If the ISI has already reduced the channel noise the DUT will be under-stressed resulting in potential false passes.
- Therefore the value of Np should be equivalent to the reference equalizer length.
- Np is the total length of the fitting function. The feedback portion of the fitting function = Np-Dp-1. Dp=4 for KR,CR, C2C and C2M. The floating tap length of the reference equalizer (Nmax) is 80 for KR and CR and 50 for C2C and C2M. Therefore Np should be 85 for KR and CR and 55 for C2C and C2M.

What is the effect of reflections in the ISI channel?

- Reflections in the ISI channel will convolve with the reflections in the Tx and could create ISI beyond the length of the reference equalizer even if the reflections in the Tx are within that length.
- The reflections in the Tx are small as per 178.9.3.3.1 the test transmitter has to pass the standard Tx specifications.
- The ISI channel should be an instrument grade channel and should also have relatively small reflections.
- Convolving two small amounts leads to a very small result.
- Although this very small result may marginally overstress the DUT it is better to have this potential false fail rather than the false pass created with a smaller value of Np.